

A New Perspective on "Virtual": Analyzing Discontinuities in the Work Environment

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Abstract

The word "virtual" has become a potent buzzword and as such, is freely applied to many situations, with many meanings. As a result, it, like other buzzwords, is in danger of meaning nothing. In this paper, we develop a more precise understanding of the use of the word "virtual" to describe changing work environments. Our specific contribution is to propose a framework to classify these different work environments based on the type of discontinuities involved. This framework enables us to compare research across a variety of different topics and work settings and further develop a foundation for future research investigating managing and working in this new environment. In this paper, we test our framework by using it to classify 75 published articles on virtual work environments and from earlier research streams.

1. Introduction

To compete effectively in today's fast-paced, rapidly changing business environment, firms must organize people and processes to enhance responsiveness and flexibility. Advanced information and communication technologies have enabled new options in organizational structure and design [3,4]. Boundaries of time and space, and even organization have become less confining, allowing dramatic changes in the work environments. The word "virtual" has become a potent buzzword to describe these changes, and as such, is freely applied to many situations, with many meanings. As a result, it, like other buzzwords, is in danger of meaning nothing.

Overuse of the term "virtual" creates two problems. First, because the term is used non-systematically and to describe many different work environments, it is not clear if and when results from different studies should be compared. For example, should researchers investigating "virtual work" where employees are members of different organizations in a supply chain look to research done on "virtual work" where employees are telecommuters? What commonalities, if any, exist among these diverse "virtual" work environments?

Second, emphasis on the term "virtual" to describe so many different situations may lead investigators to

overlook earlier potentially relevant research. For example, when investigating virtual organizations, research on network organizations, alliances, and manufacturing districts may provide insight. However, without a more precise understanding of the concepts underlying the use of the term "virtual", it is difficult to identify relevant research that was not described as "virtual."

Our objective is to develop a more precise understanding of the use of the word "virtual" as used to describe changing work environments. Our specific contribution is to propose a framework to classify these different work environments. This framework enables us to compare research across a variety of different topics and work settings and further develop a foundation for future research investigating managing and working in this new environment. In this paper, we test our framework by using it to investigate recent research on virtual work environments and to tie this work to earlier research streams.

2. Theory

2.1 Current Uses of the Word "Virtual"

The label "virtual" has been employed to label a variety of emergent work forms that differ from traditional work on numerous dimensions, such as the location of the workers, where and how work is accomplished, and the bases for relationships between workers and organizations and between organizations. "Virtual" is often used to differentiate work environments where individuals are physically or temporally dispersed. Such work environments include individuals working at home (telecommuting) as well as teams of individuals working in different geographic locations at possibly non-overlapping times (e.g., global product development or software development teams, pulled together based on skill and not location) [5,7]. These purportedly nimbler teams form to work on projects and disband when the project is over. Members of these teams may be located in different countries and have very different cultural backgrounds [1,2]. In addition to the physical dispersion of the workers, people working in these arrangements may describe their work as "virtual" because it occurs mostly via computer,

using simulated images and processes rather than exchanges of physical materials and performance of physical processes. Many new configurations involve a shift in the employee-employer relationship. A “virtual worker” might be a contingent or contract employee who is self-employed and has no dominant organizational affiliation but has temporary relationships with multiple organizations [6]. Finally, “virtual” is used to describe new kinds of inter-organizational relationships. For instance, employees of multiple organizations may collaborate to develop a product, provide a service, or foster new legislation. While the individuals cooperate to achieve a common goal, they retain their membership in different organizations [7]. These inter-organizational partnerships may be temporary, as in the case of a product-development team, or may be more long-standing, such as a procurement team in a supply chain.

Researchers using “virtual” are usually careful to define the meaning of the term as used in their studies. However, readers of the work, especially non-researchers, are likely to be confused when encountering so many different work environments described by a single term. In addition, while the term is carefully and appropriately defined for each study, the different definitions limit the use of the findings in studies of other similar, but differently classified, work environments. To facilitate progress in these diverse areas, a more precise understanding of the term “virtual” is needed.

2.2 Virtual Work is Work that Spans Discontinuities

In our view, the common thread that ties together these uses of the word “virtual” is the notion of discontinuity. We build here on Wanda Orlikowski’s notion of discontinuity and Gerardine DeSanctis’ model of dimensions of virtual work proposed in an unpublished 1999 Academy of Management symposium. In all of the previously described examples of virtual work, the word “virtual” is applied to describe work that spans one or more discontinuities:

- Discontinuities in temporal work location (e.g., working asynchronously, as in global software development teams);
- Discontinuities in geographic work location;
- Discontinuities in work group membership (who you work with);
- Discontinuities in organizational affiliation; and
- discontinuities in cultural backgrounds (national or professional).

By adopting this perspective, the varying uses of virtual discussed above can be understood as follows:

- Virtual employees can be seen as those having discontinuous organizational affiliation, work group memberships or physical or temporal locations.

- Virtual groups can be seen as those having continuous employer but discontinuities in physical or temporal locations.
- Virtual teams can be seen as those having continuous employer but discontinuous location, work group membership, and perhaps even discontinuous tasks.
- Virtual organizations can be seen as those having individuals working continuously for some employer, but interacting with a discontinuous set of other people working for other companies on a discontinuous set of projects.

2.2 Research propositions

In this paper, our objective is to attempt to apply this framework by describing different work environments in terms of discontinuities and assessing the consequences and implications of these discontinuities. The type and number of discontinuities may have different consequences or possibly the degree of the consequence may be different. For example, difficulty in developing and maintaining working relationships in a virtual environment may be one consequence. This discontinuity may be extremely difficult for contingent workers, while less difficult for members of teams who are employees of the same organization but work in different geographic locations.

More specifically, we posit the following two research propositions for this paper:

1. *Identifying discontinuities and considering their implications will help provide more systematic understanding of different uses of the term “virtual”.*
2. *Identifying discontinuities and considering their implications will provide a basis for integrating research results from studies with different uses of the term “virtual”, and earlier studies using different terms (e.g., telecommuting).*

3. Methods

In this paper, we report on a pilot study of the usefulness of our conceptual framework for understanding and linking diverse research findings. Our two research propositions address the nature of research rather than the nature of reality itself. Therefore, we addressed these propositions by content analyzing published research articles that used the term “virtual”, as well as earlier work on topics related to spanning of discontinuities. We used the published research article as the unit of analysis for this work because published articles provide a clear sampling frame, as well as the best view of what is accepted in the research community.

Table 1. Search terms and number of articles retrieved.

Search term	Number of articles retrieved
distributed group	5
distributed organization	0
distributed team	1
distributed work	2
flexible office	11
geographically dispersed team	0
global team	0
hoteling	0
telecommuting	21
telework	7
virtual community	6
virtual corporation	16
virtual office	7
virtual organization	15
virtual supply chain	3
virtual team	5
virtual work	4
virtual workplace	3
Total	75

Notes:

- 1) Total is less than the column sum because some articles matched multiple search terms.
- 2) Citations for articles analyzed in pilot study, including those discussed in Sections 4 and 5, are listed in the appendix.

To develop a pilot database of articles, we searched the *ABI Inform* article database for research articles that used terms such as “virtual work” or “virtual organization” (a complete list of terms is given below). We also searched for articles on related topics, such as “distributed group” or “telecommuting”. The authors have conducted research in different areas of the domain, and independently generated lists of keywords based on their knowledge of the topic.

ABI Inform was chosen for the pilot because it includes full-text of articles from a cross-section of business publications and because it allows searches to be restricted to peer-reviewed publications. Because we wanted only research articles, we limited our search to the “ABI/INFORM Global” and “PA Research II—Peer Reviewed” databases and limited results to peer reviewed articles. We then manually filtered out articles of fewer than 8 pages, in an effort to eliminate non-research articles in peer reviewed publications, such as columns or editorials. Finally, to facilitate our analysis for this pilot, we restricted our sample to articles for which full-text was available on-line. This search retrieved a total of 75 documents, listed in Appendix A. Articles retrieved were

published between 1986 and spring 2001. A complete list of search terms and the number of documents retrieved is shown in Table 1. Citations for the articles analyzed can be found in the Appendix.

The next step in our analysis was to analyze each article according to our framework. We summarized the key concepts and findings of each article and coded each on several dimensions (shown in Table 1) that we felt were important in understanding the nature of research conducted in this area. One author did the bulk of the coding reported here. As a check, a second author coded a random subset of articles. However, for the pilot, the goal of the coding was to refine the codes rather than to test the coding system. Therefore, disagreements in coding were discussed and used to refine the coding system.

4. Results

As expected, most studies we examined addressed discontinuities of time and space. All articles found under the keywords “telecommuting” and “telework” addressed space as a discontinuity, and with few exceptions also addressed temporal discontinuities. These articles did not address other discontinuities, such as organization or culture. An example of this type of article is one by Hartman, Stoner and Arora (1992), who reported on a survey of 262 telecommuters from 11 organizations. A majority of telecommuters reported higher productivity at home. Satisfaction with telecommuting was significantly correlated with positive support and understanding from organizational superiors.

Articles found under keywords “distributed group” and “distributed team” more often addressed discontinuities in space than time. Most of this research is focused on the design of systems for groups with the groups working synchronously, i.e., discontinuous in space but not in time. For example, based on five case studies of different distributed group support, Turoff, et al. (1993) presented a conceptual framework of systems that aid in classifying and comparing such systems. The results of the case studies demonstrate that design requirements and the associated research issues for group support systems can be very different in the distributed environment as compared to the decision room approach.

When examining the articles with keywords including virtual as adjective, we found three groupings. “Virtual office”, “virtual work” and “virtual workplace” articles addressed both time and space, but no other discontinuity. For example, Hill et al. (2001) used a large survey of IBM employees to examine the influence of perceived flexibility in the timing and location of work on work-family balance. Because of the focus on individuals and time/space discontinuities, this work may be seen as a continuation of the earlier stream of work on telecommuting. On the other hand, articles found under keyword “virtual supply chain”

typically addressed only an organizational discontinuity. For example, Chandrashekar and Schary (1999) discussed the evolution of supply chains to more flexible virtual supply chains and present associated managerial and technical issues. Finally, “virtual organization” and “virtual community” articles addressed a more complicated environment, often discussing combinations of time, space and organizational discontinuities. Many of these articles were conceptual rather than empirical. There was an understandable but regrettable lack of empirical articles in this area. Perhaps the best example of an empirical article was one by Barnatt (1997), which offered a case study of an SME (Cavendish Management Resources in the UK) that linked remote workers into a virtual organization.

Of course, our search results also included a number of articles that did not fit our framework and which we were unable to code. These articles fell into roughly three categories. First, articles that were too general, or at such a

high level of analysis that specific discontinuities and consequences could not be determined, were ruled out. For example, a number of articles discussed the changing nature of corporate strategy in a “virtual” environment without directly discussing the nature of these environments. Second, articles which did not address organizational or managerial implications of discontinuities were not coded, e.g., Handy & Mokhtarian (1995) who investigated the growth of telecommuting relative to growth of transit use or Markham (1998), who argued for the application of scientific visualization to organization science. There were also a few “false drops”, that is, articles that had the term “virtual” but which were not in fact about the subject (e.g., an article on leaks in the UK government (Tant, 1995) that coincidentally used the word “virtual” near another search term). Finally, articles found with the search term “flexible office” generally did not fit the framework. These articles assumed the existence

Table 2. Dimensions of the coding system.

The research approach:

- Field Research, Survey
- Field Research, Case Study
- Field Research, Interviews
- Conceptual
- Theoretical, Model Building
- Experimental, Student Groups
- Field Research, Student Groups
- Prescriptive

The level of analysis:

- System
- Individual
- Group
- Managerial
- Organization
- Inter-organization
- Community
- Society

The nature of the virtual work environment:

- Virtual supply chain: network of individual organizational units organized around a specific task (on-going relationship)
- Virtual organizations: staffed primarily by contract, temporary workers, core of full-time permanent employees
- Virtual corporation: temporary network of independent companies linked through IT.
- Volunteer organization of individuals (e.g., developing open source software code)
- Distributed organization: organizations consisting of 2 or more semi-autonomous units in different geographical locations linked through IT
- Virtual Enterprise networks: aggregation of small to medium enterprises (as opposed to decomposition of large organizations)
- Distributed individuals in field settings
- Distributed individuals in student groups
- Discontinuities - the dimensions of the work that were discontinuous:
 - Physical location
 - Temporal location
 - Work group membership
 - Organizational affiliation
 - Relationship with an organization (e.g., permanent vs. self-employed or temporary worker)
 - Culture
 - Functional
 - Organizational
 - Regional
 - National
 - Others, identified as the coding progressed.

of discontinuities, usually of time and space, but researchers were primarily interested in other associated outcomes, such as the allocation of employee benefits (e.g., Caputo 2000).

By classifying articles based on discontinuities, we also were able to identify areas where discontinuities are occurring but where we found relatively little research. For example, we found few articles examining a single outside contractor or contingent worker (i.e., discontinuity in relationship with organizations), even though this is a growing area of the work force. We did not find articles that investigated distributed groups of people (e.g. multiple product development groups each located in different geographic locations). These omissions may be because of our initial choice of search terms and because this work has not yet been described as “virtual”, despite its apparent connections to other kinds of “virtual” work. Finally, we found that the work on systems design was conducted primarily at the group level and most often using student groups. There seems to be little work investigating the support for information needs of individuals in this complicated environment or of the role of enterprise systems in enabling (or indeed hindering) virtual organizations.

We also grouped the articles and search terms by year of publication. While this analysis is limited by the search restrictions for our pilot study, it is interesting to note that our keyword search produced 15 articles published between 1993 and 1996, and 60 articles published between 1997 and 2000. With the exception of “virtual office” and “virtual organization,” all keywords with adjective virtual first appeared in 1997 and 1998. This outcome can be partially explained by the integration of the Web into firm activities and processes, increasing the ease of cooperation between organizations, i.e., organizational discontinuity. The dramatic increase in number of articles indicates an increase in interest in organizational innovation through technology during this time period and continuing.

5. Discussion

We have found important research being conducted with the goal of better understanding changing work environments. Although the number of articles investigating the virtual work environment has increased dramatically, our analysis indicates that the field is not yet converging. Instead of trying to make sense of “virtual” as a whole, it is important for researchers to look more closely at the work situation and investigate more precise phenomena.

Organizing articles by discontinuity allows us to differentiate groupings of research studies, and to identify similar phenomena being investigated. Our framework suggests that work can be divided and grouped by type of discontinuity enabling researchers to link similar studies

which may not be readily identified, e.g., work on a single individual discontinuous in time and space likely can be linked to work on telecommuting. The framework also helps to separate out “virtual” studies that would not be appropriate, e.g., this same work on a single individual would not be informed by “virtual” studies which solely discuss organizational discontinuity.

Adding to the complexity surrounding this body of literature are a number of articles which are presented as addressing some aspect of the virtual work environment, but which do not address anything specific about the topic. It seems as though the buzzword of virtual is used because the topic is currently fashionable. For example, one article (Roy, 1999) discusses a product modelling technique, which is presented as useful for virtual organizations. A strength of our framework is that it eliminates the buzzword “virtual” and helps researchers identify the underlying issues.

5.1 Continuities

As we analyzed the research in terms of discontinuities, it became apparent that many studies were simultaneously addressing existing or emerging *continuities*, i.e., factors or strategies for overcoming discontinuities. The focus of “virtual” is on the changes in the work environment; however, our analysis suggests the need to be equally aware of factors which have not changed and which may become more critical with the introduction of discontinuities. For example, we need to unpack group membership to understand what concretely happens so members can successfully work in a discontinuous environment. What are the continuities that enable the group to function effectively and overcome the discontinuity of space? Groups appear to fall back on their continuities in order to successfully deal with the discontinuities, so researchers should explore what is shared in the group of individuals who are collaborating at a distance: common task, common beliefs and values, common media, common work practices. Groups may also need to more explicitly agree on communication strategies in a “virtual” environment than in a more traditional environment.

A number of the studies we examined assumed technology could be a fundamental continuity in the work environments being investigated. The development and use of information and/or communication technologies were the focus of many studies we examined (e.g., Dennis 1998, Burke 1999). However, going beyond this assumption about the use of technology encourages a more comprehensive examination of the work environment, and can surface other, more subtle but critical, continuities. It is therefore necessary to investigate both discontinuities which introduce change *and* continuities which help overcome the effects of the change if we want to provide

useful insight and guidance for working and managing in virtual environments.

This approach highlights the need for research that addresses individuals and groups in actual work situations, and calls into question the use of student groups in research on virtual work. This research predominantly investigates the use of technologies to overcome discontinuities of time and space, and more recently national culture (Jarvenpaa et al. 1998). While these are important questions, the nature of this research limits our ability to separate out the effects of other discontinuities, e.g., organization, and to identify and investigate important continuities.

Finally, we have shown that our framework enables researchers to integrate findings from different bodies of literature, i.e., linking telecommuting/telework literature to “virtual” literature. Highlighting continuities in our framework can lead to the integration of other topics, which may not be as obvious, but are relevant and useful. For example, we have identified common professional identity as an important continuity in one study where there is organizational discontinuity (Barnatt 1997). This insight could lead the researcher to link research on developing professional identity with “virtual” research addressing organizational discontinuity.

6. Limitations

This study has limitations that must be noted. The primary limitation is that our article search was limited to a single database, *ABI/Inform*. This database does not include articles some of the more prominent journals. For example, a conspicuous omission in the MIS field is *Information Systems Research*, a consistently top-ranked journal. We also limited our search to full-text articles, which further bounded the results. We do not believe, however, that the omission of these articles from our study significantly biases our results. There is little reason to believe that the research published in the journals that were not included in our survey would differ substantially from those in our selection in terms of the discontinuities being addressed.

A primary objective of this research is to understand the different uses of the term “virtual” in the research community at large. Our search did include journals from a variety of academic disciplines, e.g., geography, transportation, health management, public policy, and others. Looking at this broad subset of the total articles published using the term “virtual” to describe different work situations allows us to accomplish this objective.

7. Conclusions

Our results from this pilot study indicate that our framework does help provide more systematic understanding of research being conducted and changes

occurring in the work environment. However, we need additional work to clarify our definitions and refine our coding system, as well as coding articles more systematically. For example, we need to develop a method to handle articles that have been assigned multiple keywords as there is currently overlap in the categorization of this type of article.

One option for future work is to obtain a larger and more comprehensive sample of articles to analyze. We could expand our search by manually retrieving articles instead of limiting our search to full-text articles. In addition, we could search additional databases with different or more extensive journal coverage.

We believe that it is probably more useful to attempt to further cumulate findings from the research that has been done. Our initial analysis has resulted in a number of interesting insights into the virtual work environment and the research being conducted that warrant further examination. We feel that a more complete examination of the literature, especially focusing on the continuities that are explicitly or implicitly addressed, would be valuable.

This paper is based on work presented by the authors in a symposium entitled “Discontinuities: The Key to Understanding Virtual Work” at the Academy of Management Conference, August 2000. The authors acknowledge the other participants in the symposium: Paul Goodman, Julie Rennecker, Carol Saunders, and Jeanne Wilson.

References

- [1] Boudreau, M.-C., Loch, K.D., Robey, D., and Straub, D. (1998) “Going Global: Using Information Technology to Advance the Competitiveness of the Virtual Transnational Organization,” *Academy of Management Executive*, 12(4), 120-128.
- [2] Carmel, E. (1999) *Global Software Teams: Collaborating Across Borders and Time Zones*, Upper Saddle River, NJ: Prentice Hall.
- [3] Davidow, W. H. and Malone, M. S. (1992) *The Virtual Corporation*, New York: Harper.
- [4] DeSanctis, G. and Monge, P. (1999) “Introduction to the Special Issue: Communication Processes for Virtual Organizations,” *Organization Science*, 10(6), 693-703.
- [5] Meadows, C.J. (1996) “Globalizing Software Development,” *Journal of Global Information Management*, 4(1), 5-14.
- [6] Mowshowitz, A. (1997) “Virtual Organization,” *Communications of the ACM*, 40(9), 30-37.
- [7] Townsend, A. M., DeMarie, S.M., and Hendrickson, A.R. (1998) “Virtual Teams: Technology and the Workplace of the Future,” *Academy of Management Executive*, 12(3), 17-29.

Appendix Articles Analyzed In Pilot Study		Citation	Keyword(s)
		Boudreau, M.-C., Loch, K. D., Robey, D., & Straud, D. (1998). Going global: Using information technology to advance the competitiveness of the virtual transnational organization. <i>The Academy of Management Executive</i> , 12(4), 120-128.	Virtual corporation, virtual organization
Adacher, L., Agnetis, A., & Meloni, C. (2000). Autonomous agents architectures and algorithms in flexible manufacturing systems. <i>IIE Transactions</i> , 32(10), 941-951.	Flexible office	Briggs, R. O., Nunamaker, J. F., Jr., & Sprague, R. H., Jr. (1997). 1001 unanswered research questions in GSS. <i>Journal of Management Information Systems</i> , 14(3), 3-21.	Telework, virtual work, virtual workplace
Adams, P. C. (1997). Cyberspace and virtual places. <i>Geographical Review</i> , 87(2), 155-171.	Virtual office	Burke, K., Aytes, K., Chidambaram, L., & Johnson, J. J. (1999). A study of partially distributed work groups: The impact of media, location, and time on perceptions and performance. <i>Small Group Research</i> , 30(4), 453-490.	Distributed group, distributed work
Adams, T. L. (1997). Follow the yellow brick road: Using diffusion of innovations theory to enrich virtual organizations in cyberspace. <i>The Southern Communication Journal</i> , 62(2), 133-148.	Virtual corporation, virtual organization	Caputo, R. K. (2000). The availability of traditional and family-friendly employee benefits among a cohort of young women, 1968-1995. <i>Families in Society</i> , 81(4), 422-436.	Flexible office
Allcorn, S. (1997). Parallel virtual organizations: managing and working in the virtual workplace. <i>Administration & Society</i> , 29(4), 412.	Virtual organization, virtual work, virtual workplace	Carnoy, M. (1999). The family, flexible work and social cohesion at risk. <i>International Labour Review</i> , 138(4), 411-429.	Flexible office
Anderson, R. E. (1996). Personal selling and sales management in the new millennium. <i>The Journal of Personal Selling & Sales Management</i> , 16(4), 17-32.	Virtual office	Cascio, W. F. (2000). Managing a virtual workplace. <i>The Academy of Management Executive</i> , 14(3), 81-90.	Telecommuting, telework, virtual team, virtual work, virtual workplace
Bae, C.-H. C. (1993). Air quality and travel behavior. <i>American Planning Association. Journal of the American Planning Association</i> , 59(1), 65.	Telecommuting	Chandrashekar, A., & Scharj, P. B. (1999). Toward the virtual supply chain: The convergence of IT and organization. <i>International Journal of Logistics Management</i> , 10(2), 27-39.	Virtual corporation, virtual organization, virtual supply chain
Bal, J., Wilding, R., & Gundry, J. (1999). Virtual teaming in the agile supply chain. <i>International Journal of Logistics Management</i> , 10(2), 71-82.	Virtual corporation, virtual supply chain	Crawford, J. W., Jr, & Krahn, S. L. (1998). The demanding customer and the hollow organization: Meeting today's contract management challenge. <i>Public Productivity & Management Review</i> , 22(1), 107-118.	Virtual corporation
Barnatt, C. (1997). Virtual organisation in the small business sector: The case of Cavendish Management Resources. <i>International Small Business Journal</i> , 15(4), 36-47.	Virtual corporation, virtual organization	Davenport, T. H., & Pearlson, K. (1998). Two cheers for the virtual office. <i>Sloan Management Review</i> , 39(4), 51-65.	Telecommuting virtual corporation, virtual organization, virtual work
Barry, D., & Elmes, M. (1997). Strategy retold: Toward a narrative view of strategic discourse. <i>Academy of Management. The Academy of Management Review</i> , 22(2), 429-452.	Virtual organization	Dennis, A. R., Pootheri, S. K., & Natarajan, V. L. (1998). Lessons from the Early Adopters of Web Groupware. <i>Journal of Management Information Systems</i> , 14(4), 65-86.	Virtual community
Bezold, C., Mayer, E., & Dighe, A. (1997). Visionary leadership and the future of VA health system. <i>Hospital & Health Services Administration</i> , 42(3), 367-382.	Virtual organization		
Boczkowski, P. J. (1999). Mutual shaping of users and technologies in a national virtual community. <i>Journal of Communication</i> , 49(2), 86-108.	Virtual community		

Citation	Keyword(s)	Citation	Keyword(s)
Dombrow, J. C. (1998). Electronic communications and the law: Help or hindrance to telecommuting? <i>Federal Communications Law Journal</i> , 50(3), 685-709.	Telecommuting	Hill, E. J., Hawkins, A. J., Ferris, M., & Weitzman, M. (2001). Finding an extra day a week: The positive influence of perceived job flexibility on work and family life balance. <i>Family Relations</i> , 50(1), 49-58.	Virtual office
Fairweather, N. B. (1999). Surveillance in employment: The case of teleworking. <i>Journal of Business Ethics</i> , 22(1 2), 39-49.	Telecommuting telework	Hill, E. J., Hawkins, A. J., & Miller, B. C. (1996). Work and family in the virtual office: Perceived influences of mobile telework. <i>Family Relations</i> , 45(3), 293.	Telecommuting, telework
Fitzpatrick, W. M., & Burke, D. R. (2000). Form, functions, and financial performance realities for the virtual organization. <i>S.A.M. Advanced Management Journal</i> , 65(3), 13-20.	Virtual corporation, virtual organization	Hill, E. J., Miller, B. C., Weiner, S. P., & Colihan, J. (1998). Influences of the virtual office on aspects of work and work/life balance. <i>Personnel Psychology</i> , 51(3), 667-683.	Telecommuting, telework, virtual corporation, virtual office
Fox, N., & Roberts, C. (1999). GPs in cyberspace: The sociology of a 'virtual community'. <i>The Sociological Review</i> , 47(4), 643-671.	Virtual community	Hoogeweegen, M. R., Teunissen, W. J. M., Vervest, P. H. M., & Wagenaar, R. W. (1999). Modular network design: Using information and communication technology to allocate production tasks in a virtual organization. <i>Decision Sciences</i> , 30(4), 1073-1103.	Virtual corporation, virtual organization
Fritz, M. B. W., Narasimhan, S., & Rhee, H.-S. (1998). Communication and coordination in the Virtual Office. <i>Journal of Management Information Systems</i> , 14(4), 7-28.	Telecommuting, virtual office	Huh, S.-Y., Chung, Q. B., & Kim, H.-M. (2000). Collaborative model management in departmental computing. <i>INFOR</i> , 38(4), 373-389.	Distributed group
Gavish, B., Gerdes, J. J., & Sridhar, S. (1995). CM3: A distributed group decision support system. <i>IIE Transactions</i> , 27(6), 722.	Distributed group	Igbaria, M., & Guimaraes, T. (1999). Exploring differences in employee turnover intentions and its determinants among telecommuters and non-telecommuters. <i>Journal of Management Information Systems</i> , 16(1), 147-164.	Telecommuting
Golden, L. (2001). Flexible work schedules: Which workers get them? <i>The American Behavioral Scientist</i> , 44(7), 1157-1178.	Flexible office	Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. (1998). Is Anybody Out There? Antecedents of Trust in Global Virtual Teams. <i>Journal of Management Information Systems</i> , 14(4), 29-64.	Virtual team
Handy, S. L., & Mokhtarian, P. L. (1995). Planning for telecommuting. <i>American Planning Association. Journal of the American Planning Association</i> , 61(1), 99.	Telecommuting	Kasarda, J. D., & Rondinelli, D. A. (1998). Innovative infrastructure for agile manufacturers. <i>Sloan Management Review</i> , 39(2), 73-82.	Virtual corporation
Hartman, R. I., Stoner, C. R., & Arora, R. (1992). Developing successful organizational telecommuting arrangements: Worker perceptions and managerial prescriptions. <i>S.A.M. Advanced Management Journal</i> , 57(3), 35.	Telecommuting	Kemp, D. R. (1995). Telecommuting in the public sector: An overview and a survey of the states. <i>Review of Public Personnel Administration</i> , 15(3), 5.	Telecommuting
Hawkins, R., Mansell, R., & Steinmueller, W. E. (1999). Toward digital intermediation in the information society. <i>Journal of Economic Issues</i> , 33(2), 383-392.	Virtual community	Khan, M. B., Tung, L. L., & Turban, E. (1997). Telecommunicating: Comparing Singapore to Southern California. <i>Human Systems Management</i> , 16(2), 91-98.	Telecommuting
Herschel, R. T., & Andrews, P. H. (1997). Ethical implications of technological advances on business communication. <i>The Journal of Business Communication</i> , 34(2), 160-170.	Telecommuting		

Citation	Keyword(s)	Citation	Keyword(s)
Kinard, J., & Little, B. (1999). Are hospitals facing a critical shortage of skilled workers? <i>The Health Care Supervisor</i> , 17(4), 54-62.	Flexible office	Ocker, R., Hiltz, S. R., Turoff, M., & Fjermestad, J. (1995). The effects of distributed group support and process structuring on software requirements development teams: Results on creativity and quality. <i>Journal of Management Information Systems</i> , 12(3), 127.	Distributed group
Koch, C. (2000). Collective influence on information technology in virtual organizations-emanipatory management of technology? <i>Technology Analysis & Strategic Management</i> , 12(3), 357-368.	Virtual organization	Ogilvie, H. (1994). This old office. <i>The Journal of Business Strategy</i> , 15(5), 26.	Telecommuting, virtual office
Kraut, R. E. (1989). Telecommuting: The Trade-Offs of Home Work. <i>Journal of Communication</i> , 39(3), 19.	Telecommuting	Osterman, P. (1994). How common is workplace transformation and who adopts it? <i>Industrial & Labor Relations Review</i> , 47(2), 173.	Flexible office
Leach, N. P., Makatsoris, C., & Richards, H. D. (1997). Supply chain control: Trade-offs and system requirements. <i>Human Systems Management</i> , 16(3), 159-169.	Virtual supply chain	Preston, V., Holmes, J. N., & Williams, A. (1997). Working with 'Wild Rose I': Lean production in a Greenfield mill. <i>Canadian Geographer</i> , 41(1), 88-104.	Flexible office
Lewis, R. (1998). Membership and management of a 'virtual' team: The perspectives of a research manager. <i>R & D Management</i> , 28(1), 5-12.	Distributed team	Rehm, M. L. (2000). An aesthetic approach to virtual community. <i>Family and Consumer Sciences Research Journal</i> , 29(2), 153-172.	Virtual community
Lucas, H. C. J., & Baroudi, J. (1994). The role of information technology in organization design. <i>Journal of Management Information Systems</i> , 10(4), 9.	Virtual organization	Reinsch, N. L., Jr. (1997). Relationships between telecommuting workers and their managers: An exploratory study. <i>The Journal of Business Communication</i> , 34(4), 343-369.	Telecommuting
Markham, S. E. (1998). The scientific visualization of organizations: A rationale for a new approach to organizational modeling. <i>Decision Sciences</i> , 29(1), 1-23.	Virtual corporation	Reinsch, N. L., Jr. (1999). Selected communication variables and telecommuting participation decisions: Data from telecommuting workers. <i>The Journal of Business Communication</i> , 36(3), 247-260.	Telecommuting
Markus, M. L., & Agres, B. M. C. E. (2000). What makes a virtual organization work? <i>Sloan Management Review</i> , 42(1), 13-26.	Virtual organization	Robey, D., Khoo, H. M., & Powers, C. (2000). Situated learning in cross-functional virtual teams. <i>Technical Communication</i> , 47(1), 51-66.	Virtual team
Mirchandani, K. (1999). Legitimizing work: Telework and the gendered reification of the work-nonwork dichotomy. <i>The Canadian Review of Sociology and Anthropology</i> , 36(1), 87-107.	Telecommuting, telework	Roy, U., & Kodkani, S. S. (1999). Product modeling within the framework of the World Wide Web. <i>IIE Transactions</i> , 31(7), 667-677.	Virtual organization
Mirvis, P. H. (1997). Human resource management: Leaders, laggards, and followers. <i>The Academy of Management Executive</i> , 11(2), 43-56.	Flexible office	Shepard, E. M. I., Clifton, T. J., & Kruse, D. (1996). Flexible work hours and productivity: Some evidence from the pharmaceutical industry. <i>Industrial Relations</i> , 35(1), 123-139.	Flexible office
Mokhtarian, P. L. (1998). A synthetic approach to estimating the impacts of telecommuting on travel. <i>Urban Studies</i> , 35(2), 215-241.	Telecommuting	Silver, H., & Goldscheider, F. (1994). Flexible work and housework: Work and family constraints on women's domestic labor. <i>Social Forces</i> , 72(4), 1103.	Flexible office

Citation	Keyword(s)
Smith, A. E. (1993). Canadian industrial relations in transition. <i>Relations Industrielles</i> , 48(4), 641.	Flexible office
Tant, A. P. (1995). 'Leaks' and the nature of British government. <i>The Political Quarterly</i> , 66(2), 197.	Virtual organization
Townsend, A. M., DeMarie, S. M., & Hendrickson, A. R. (1998). Virtual teams: Technology and the workplace of the future. <i>The Academy of Management Executive</i> , 12(3), 17-29.	Virtual corporation, virtual team
Turoff, M., Hiltz, S. R., Bahgat, A. N. F., & Rana, A. R. (1993). Distributed group support systems. <i>MIS Quarterly</i> , 17(4), 399.	Distributed group
Tyler, K., McGirr, D., & Stanley, E. (1998). Contextualising: Technology, relationships and time in a financial services virtual organisation. <i>The Service Industries Journal</i> , 18(3), 70-89.	Virtual corporation
Venkatraman, N., & Henderson, J. C. (1998). Real strategies for virtual organizing. <i>Sloan Management Review</i> , 40(1), 33-48.	Virtual corporation
Warkentin, M. E., Sayeed, L., & Hightower, R. (1997). Virtual teams versus face-to-face teams: An exploratory study of a Web-based conference system. <i>Decision Sciences</i> , 28(4), 975-996.	Virtual team
Watad, M. M., & DiSanzo, F. J. (2000). Case study: The synergism of telecommuting and office automation. <i>Sloan Management Review</i> , 41(2), 85-96.	Telecommuting, telework
Williams, M. (2000). Virtually criminal: Discourse, deviance and anxiety within virtual communities. <i>International Review of Law, Computers & Technology</i> , 14(1), 95-104.	Virtual community
Wilson, F. (1999). Cultural control within the virtual organization. <i>The Sociological Review</i> , 47(4), 672-694.	Virtual corporation, virtual organization
Woolridge, B. (1994). Changing demographics of the workforce: Implications for the use of technology as a productivity improvement strategy. <i>Public Productivity & Management Review</i> , 17(4), 371.	Distributed work