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# Virtual Teams and Management Challenges

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## Abstract

As a result of globalization and advances in information and communication technologies, the increased use of virtual teams in business has become prominent. In the competitive environment companies are obliged to produce more rapidly, more effectively and more efficiently. It is necessary for them to put together different capabilities and services with the goal, through cooperation between suppliers and customers, service providers and scientific institutions to achieve firm's objective with high quality. Nowadays shift from serial to simultaneous and parallel working in entity has become more commonplace. Literatures have shown that collaboration is as a meta-capability for companies. This article after define a virtual teams and its characteristics, addressing virtual environments and relationship with different challenges which organization should deal them such as management and employee challenges. Finally conclude that managers of company should invest less in tangible assets, but more in virtual team to generate knowledge, and in their employees' creativity to stimulate incremental innovations in already existing technologies that will directly generate their future competitive advantage. Companies must educate everyone, not just virtual employees, on the virtual team culture but both employees and managers need to understand the dealing aspects with virtual team.

**Keywords:** Virtual Team, Management Challenge, Collaboration, ICT application

## **1. Introduction**

Collaboration is becoming increasingly important in creating the knowledge that makes business more competitive. Virtual teams are growing in popularity [1] and many organizations have responded to their dynamic environments by introducing virtual teams. Additionally, the rapid development of new communication technologies such as the Internet has accelerated this trend so that today, most of the larger organization employs virtual teams to some degree [2]. A growing number of flexible and adaptable organizations have explored the virtual environment as one means of achieving increased responsiveness [3]. Howells et al. [4] state that the shift from serial to simultaneous and parallel working has become more commonplace. Based on conventional information technologies and Internet-based platforms virtual environments may be used to sustain companies' progress through virtual interaction and communication.

This paper provides comprehensive aspects of virtual teams based on authentic and reputed publications, after define virtual teams and its characteristics, addressing virtual environments and relationship with management and employee challenges. Finally conclude that virtual team cannot be successful unless the knowledge and information in the company are effectively captured, shared and internalized by the entity manager. Doing an extensive literature survey, further studies are recommended. Managerial implications on those issues are also discussed.

## **2. Virtual teams definition**

This era is growing popularity for virtual team structures in organizations [1, 5]. Martins et al. [6] in a major review of the literature on virtual teams, conclude that 'with rare exceptions all organizational teams are virtual to some extent.' We have moved away from working with people who are in our visual proximity to working with people around the globe [7]. Although virtual teamwork is a current topic in the literature on global organizations, it has been problematic to define what 'virtual' means across multiple institutional contexts [8]. It is worth mentioning that virtual teams are often formed to overcome geographical or temporal separations [9]. Virtual teams work across boundaries of time and space by utilizing modern computer-driven technologies. The term "virtual team" is used to cover a wide range of activities and forms of technology-supported working [10]. Virtual teams are comprised of members who are located in more than one physical location. This team trait has fostered extensive use of a variety of forms of computer-mediated communication that enable geographically dispersed members to coordinate their individual efforts and inputs [11]. From the perspective of Leenders et al.[12] virtual teams are groups of individuals collaborating in the execution of a specific project while geographically and often temporally distributed, possibly anywhere within (and beyond) their parent organization. Amongst the different definitions of the concept of a virtual team the following from is one of the most widely accepted: [13], "virtual teams as groups of geographically, organizationally and/or time dispersed workers brought together by information technologies to accomplish one or more organization tasks". The degree of geographic dispersion within a virtual team can vary widely from having one member located in a different location than the rest of the team to having each member located in a different country [14].

## **3. Advantages and pitfalls of virtual teams**

The availability of a flexible and configurable base infrastructure is one of the main advantages of agile virtual teams. [10]. Virtual R&D teams which members do not work at the same time or place [15] often face tight schedules and a need to start quickly and perform instantly [16]. On the other hand, virtual teams reduce time-to-market [17]. Lead Time or Time to market has been generally admitted to be one of

the most important keys for success in manufacturing companies [18]. Table 1 summarizes some of the main advantages and

Table 2 some of the main disadvantages associated with virtual teaming.

**Table 1: Some of the main advantages associated with virtual teaming.**

<b>Advantages</b>	<b>References</b>
Reducing relocation time and costs, reduced travel costs	[1, 19-29]
Reducing time-to-market [Time also has an almost 1:1 correlation with cost, so cost will likewise be reduced if the time-to market is quicker [30]]	[17, 18, 23, 24, 29, 31-38]
Able to tap selectively into center of excellence, using the best talent regardless of location	[1, 22, 24, 26, 39-43]
Greater productivity, shorter development times	[19, 35]
Greater degree of freedom to individuals involved with the development project	[44]
Higher degree of cohesion (Teams can be organized whether or not members are in proximity to one another)	[1, 45, 46]
Producing better outcomes and attract better employees	[6, 20]
Provide organizations with unprecedented level of flexibility and responsiveness	[13, 24, 28, 31, 36, 47-49]
Respond quickly to changing business environments	[21, 35]
Sharing knowledge, experiences	[50, 51]
Enable organizations to respond faster to increased competition	[47, 52]
Better team outcomes (quality, productivity, and satisfaction)	[46, 53]
Most effective in making decisions	[54]
Higher team effectiveness and efficiency	[17, 55]
Self-assessed performance and high performance.	[8, 56]
Cultivating and managing creativity	[12]
Improve the detail and precision of design activities	[57]
Provide a vehicle for global collaboration and coordination of R&D-related activities	[58]

**Table 2: Some of the main disadvantages associated with virtual teaming.**

<b>Disadvantages</b>	<b>References</b>
lack of physical interaction	[1, 20, 23, 54]
everything to be reinforced in a much more structured, formal process	[59].
Challenges of project management are more related to the distance between team members than to their cultural or language differences	[60].
Challenges of determining the appropriate task technology fit	[61, 62]
Cultural and functional diversity in virtual teams lead to differences in the members' thought processes. Develop trust among the members are challenging	[23, 56, 58]
Will create challenges and obstacles like technophobia ( employees who are uncomfortable with computer and other telecommunications technologies)	[7]
Variety of practices (cultural and work process diversity) and employee mobility negatively impacted performance in virtual teams.	[8]
Team members need special training and encouragement	[63]

#### **4. Virtual and traditional teams**

Unlike a traditional team, a virtual team works across space, time and organizational boundaries with links strengthened by webs of communication technologies. However, many of the best practices for traditional teams are similar to those for virtual teams [21]. Virtual teams are significantly different from

traditional teams. In the proverbial traditional team, the members work next to one another, while in virtual teams they work in different locations. In traditional teams the coordination of tasks is straightforward and performed by the members of the team together; in virtual teams, in contrast, tasks must be much more highly structured. Also, virtual teams rely on electronic communication, as opposed to face-to-face communication in traditional teams. Table 3 summarizes these distinctions [45]. Diversity in national background and culture is common in transnational and virtual teams [14].

**Table 3: Virtual and traditional teams are usually viewed as opposites.**

Fully Traditional Team	Fully Virtual Team
Team members all co-located.	Team members all in different locations.
Team members communicate face-to-face (i.e., synchronous and personal)	Team members communicate through asynchronous and impersonal means.
Team members coordinate team task together, in mutual adjustment.	The team task is so highly structured that coordination by team members is rarely necessary.

In particular, reliance on computer-mediated communication makes virtual teams unique from traditional ones [16]. The processes used by successful virtual teams will be different from those used in face-to-face collaborations (FFCs) [20]. In an innovation network resembling a “traditional” organization, the innovation process is more restricted by location and time. In other words, the innovation process mostly takes place within the framework of physical offices and working hours. In virtual organizations, individuals’ work is not restricted by time and place, and communication is strongly facilitated by IT. Such a product development environment allows a greater degree of freedom to individuals involved with the development project [44]. Hence multinational companies (MNC) are more likely to become tightly integrated into global R&D network than smaller unit [64]. Distributed teams can carry out critical tasks with appropriate decision support technologies [65].

## 5. Physical versus virtual

Pawar and Sharifi [66] study of virtual versus collocated team success and classified physical teams versus virtual teams in six categories. Table 4 summarizes these differences.

**Table 4: Classifying physical teams versus virtual teams**

Activity	Physical teams nature	Virtual teams nature
Nature of interaction	opportunity to share work and non-work related information	the extent of informal exchange of information is minimal
Utilization of resources	Increases the opportunity for allocation and sharing of resources	each collaborating body will have to have access to similar technical and non-technical infrastructure
Control and accountability (over and within the project):	the project manager provides the Context for ongoing monitoring of activities and events and thus enhances their ability to respond to requirements.	The collaborating bodies were accountable to the task leaders and the project coordinator who had limited authority to enforce any penalties for failure to achieve their tasks
Working environment	they encountered constraints accessing information and interacting with others outside the collocated team within the company	Sometimes not able to share ideas or dilemmas with other partners.
Cultural and educational background	members of the team are likely to have similar and complementary cultural and educational background	the team members varied in their education, culture, language, time orientation and expertise

Lurey and Raisinghani [59] base on virtual teams survey in 12 separate virtual teams from eight different sponsor companies in the high technology found that, organizations choosing to implement virtual teams should focus much of their efforts in the same direction they would if they were implementing traditional, co-located teams.

## 6. Management challenges

More and more companies are faced with the necessity to get the knowledge and expertise they require in different projects from different domains and areas [67], therefore, people from different companies often need to work together to bring the entire knowledge and experience that are needed for the success of a new product, process or service. Virtual teams represent a large pool of know-how which seems to be a promising source of companies' growth. At present, except for open source software, little is known about how to utilize this know-how [68]. Hence manager of enterprises should establish a connection between different departments and companies through virtual team stand on information technology. Based on a time scale, Figure 1 presents significant innovations that have had an impact on operation management (OM) [69]. Over the past decade, the developments in communications, primarily based on ICTs, have created a new platform for OM to connect enterprises and customers in a seamless information network.

The continuous rapid growth in project information volume as the project progresses makes it increasingly difficult to find, organize, access and maintain the information required by project users [70]. This particular problem can be highlighted in two cases document management on site and Information management at the facilities management stage [70]. Dealing with multiple, cross functional people and teams highlighted managing challenge. Manager of virtual team should overcome the managing conflict [49, 62, 71-74] , cultural and functional diversity in virtual teams [16, 23, 42, 43, 56, 58, 75-78] and mistrust among the team members [1, 50, 79-81].

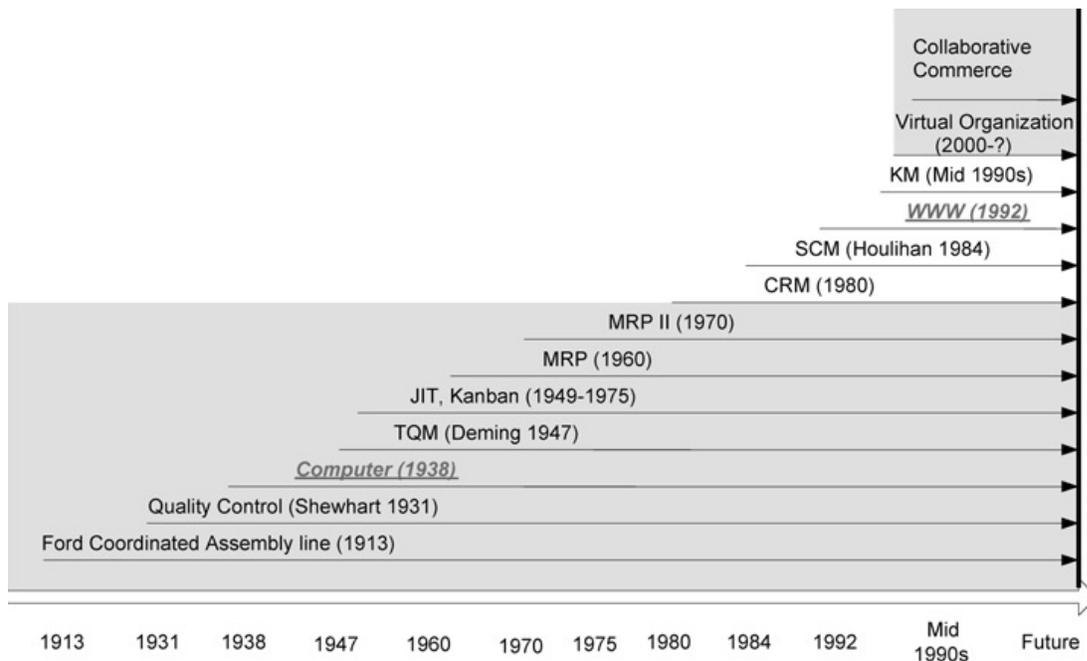


Figure 1 Innovation in operations management (Source: Bayraktar et al.(2007))

## 7. Conclusions

Since cross functional and virtual work teams are dealing with complex problems, it makes sense that cross functional virtual management teams are needed to support them. Problems from one team can pollinate widely on to other virtual teams. Management must define the escalation path to resolve virtual, cross functional issues. While reviewing the previous study refer to Table 1 and

Table 2, it's believed that the advantages of working on the basis of virtual teams far outweigh the disadvantages and firms cannot be successful unless the knowledge and information in the company are effectively captured, shared and internalized by the entities virtual team members.

This paper has provided an extensive review of literature and related resources covering the theme of virtual teams and management issue. Clearly there is a considerable scope for extending this study to specify filed such as small and medium enterprises (SMEs) and relationship with virtual team. Further research has to be done on this topic to fully understand the influence of virtual team on company practically. There is considerable literature on distributed and virtual teams. The coverage includes management challenges, technology enablers and organizational and multi-cultural challenges. However, limited work has been directed towards exploring and analyzing the existing inter-relation. Therefore future research shall be aimed at shifting away from investigating virtual teams separately to the formation and development of a collaborative system which can support a dispersed team effectively. Keeping virtual teams in company growth processes, operating innovatively, effectively and efficiently is of a high importance, but the issue has poorly been addressed simultaneously in the previous studies.

Managers of company should invest less in tangible assets, but more in virtual team to generate knowledge, and increase employees' creativity to stimulate incremental innovations in already existing information technology that will directly generate their future competitive advantage.

## 8. References

1. Cascio, W.F., *Managing a virtual workplace*. The Academy of Management Executive, 2000. **14**(3): p. 81-90.
2. Hertel, G.T., S. Geister, and U. Konradt, *Managing virtual teams: A review of current empirical research*. Human Resource Management Review, 2005. **15**: p. 69-95.
3. Furst, S., R. Blackburn, and B. Rosen, *Virtual team effectiveness: a proposed research agenda*. Information Systems Journal, 2001. **9**(4): p. 249 - 269.
4. Howells, J., A. James, and K. Malik, *The sourcing of technological knowledge: distributed innovation processes and dynamic change*. R&D Management, 2003. **33**(4): p. 395-409.
5. Walvoord, A.A.G., et al., *Empowering followers in virtual teams: Guiding principles from theory and practice*, *Computers in Human Behavior (article in press)*. 2008.
6. Martins, L.L., L.L. Gilson, and M.T. Maynard, *Virtual teams: What do we know and where do we go from here?* Journal of Management, 2004. **30**(6): p. 805-835.
7. Johnson, P., V. Heimann, and K. O'Neill, *The "wonderland" of virtual teams*. Journal of Workplace Learning, 2001. **13**(1): p. 24 - 30.
8. Chudoba, K.M., et al., *How virtual are we? Measuring virtuality and understanding its impact in a global organization*. Information Systems Journal, 2005. **15**(4): p. 279-306.
9. Cascio, W.F. and S. Shurygailo, *E-Leadership and Virtual Teams*. Organizational Dynamics, 2003. **31**(4): p. 362-376.
10. Anderson, A.H., et al., *Virtual team meetings: An analysis of communication and context*. Computers in Human Behavior, 2007. **23**: p. 2558-2580.
11. Peters, L.M. and C.C. Manz, *Identifying antecedents of virtual team collaboration*. Team Performance Management, 2007. **13**(3/4): p. 117-129.

12. Leenders, R.T.A.J., J.M.L.V. Engelen, and J. Kratzer, *Virtuality, communication, and new product team creativity: a social network perspective*. Journal of Engineering and Technology Management, 2003. **20**: p. 69–92.
13. Powell, A., G. Piccoli, and B. Ives, *Virtual teams: a review of current literature and directions for future research*. The Data base for Advances in Information Systems, 2004. **35**(1): p. 6–36.
14. Staples, D.S. and L. Zhao, *The Effects of Cultural Diversity in Virtual Teams Versus Face-to-Face Teams*. Group Decision and Negotiation, 2006 **15**(4): p. 389-406.
15. Stoker, J.I., et al., *Leadership and innovation: relations between leadership, individual characteristics and the functioning of R&D teams*. The International Journal of Human Resource Management, 2001. **12**(7): p. 1141 – 1151.
16. Munkvold, B.E. and I. Zigurs, *Process and technology challenges in swift-starting virtual teams*. Information & Management, 2007. **44**(3): p. 287–299.
17. May, A. and C. Carter, *A case study of virtual team working in the European automotive industry*. International Journal of Industrial Ergonomics, 2001. **27**: p. 171-186.
18. Sorli, M., et al., *Managing product/process knowledge in the concurrent/simultaneous enterprise environment*. Robotics and Computer-Integrated Manufacturing, 2006. **22**: p. 399–408.
19. McDonough, E.F., K.B. Kahn, and G. Barczak, *An investigation of the use of global, virtual, and collocated new product development teams*. The Journal of Product Innovation Management, 2001. **18**(2): p. 110–120.
20. Rice, D.J., et al., *Improving the Effectiveness of Virtual Teams by Adapting Team Processes*. Computer Supported Cooperative Work, 2007. **16**: p. 567–594.
21. Bergiel, J.B., E.B. Bergiel, and P.W. Balsmeier, *Nature of virtual teams: a summary of their advantages and disadvantages*. Management Research News, 2008. **31**(2): p. 99-110.
22. Fuller, M.A., A.M. HARDIN, and R.M. DAVISON, *Efficacy in Technology-Mediated Distributed Team* Journal of Management Information Systems, 2006. **23**(3): p. 209-235.
23. Kankanhalli, A., B.C.Y. Tan, and K.-K. Wei, *Conflict and Performance in Global Virtual Teams*. Journal of Management Information Systems, 2006. **23**(3): p. 237-274.
24. Prasad, K. and K.B. Akhilesh, *Global virtual teams: what impacts their design and performance?* Team Performance Management, 2002 **8**(5/6): p. 102 - 112.
25. Olson-Buchanan, J.B., et al., *Utilizing virtual teams in a management principles course*. Education + Training, 2007. **49**(5): p. 408-423.
26. Boudreau, M.-C., et al., *Going Global: Using Information Technology to Advance the Competitiveness Of the Virtual Transnational Organization*. Academy of Management Executive, 1998. **12**(4): p. 120-128.
27. Biuk-Aghai, R.P., *Patterns of Virtual Collaboration*, in *Faculty of Information Technology*. 2003, University of Technology: Sydney. p. 291.
28. Liu, B. and S. Liu, *Value Chain Coordination with Contracts for Virtual R&D Alliance Towards Service*, in *The 3rd IEEE International Conference on Wireless Communications, Networking and Mobile Computing, WiCom 2007*. 2007, IEEE Xplore: Shanghai, China. p. 3367-3370.
29. Lipnack, J. and J. Stamps, *Why The Way to Work*, in *Virtual Teams , Second Edition 2000*, John Wiley & Sons: New York. p. 1-25.
30. Rabelo, L. and T.H.S. Jr., *Sustaining growth in the modern enterprise: A case study*. Journal of Engineering and Technology Management JET-M, 2005. **22** p. 274-290.
31. Chen, T.-Y., *Knowledge sharing in virtual enterprises via an ontology-based access control approach*. Computers in Industry, 2008. **Article In press**: p. No of Pages 18.
32. Shachaf, P., *Cultural diversity and information and communication technology impacts on global virtual teams: An exploratory study*. Information & Management, 2008 **45**(2): p. 131-142.
33. Kusar, J., et al., *How to reduce new product development time*. Robotics and Computer-Integrated Manufacturing 2004. **20**: p. 1-15.
34. Ge, Z. and Q. Hu, *Collaboration in R&D activities: Firm-specific decisions*. European Journal of Operational Research 2008. **185**: p. 864-883.
35. Mulebeke, J.A.W. and L. Zheng, *Incorporating integrated product development with technology road mapping for dynamism and innovation*. International Journal of Product Development 2006 **3**(1): p. 56 - 76.
36. Guniš, A., J. Šišlák, and Š. Valčuha, *Implementation Of Collaboration Model Within SME's*, in *Digital Enterprise Technology-Perspectives and Future Challenges*, P.F. Cunha and P.G. Maropoulos, Editors. 2007, Springer US. p. 377-384

37. Zhang, S., W. Shen, and H. Ghenniwa, *A review of Internet-based product information sharing and visualization*. Computers in Industry 2004. **54**(1): p. 1-15.
38. Sridhar, V., et al., *Analyzing Factors that Affect Performance of Global Virtual Teams*, in *Second International Conference on Management of Globally Distributed Work 2007*: Indian Institute of Management Bangalore, India. p. 159-169.
39. Criscuolo, P., *On the road again: Researcher mobility inside the R&D network*. Research Policy, 2005. **34**: p. 1350-1365
40. Samarah, I., S. Paul, and S. Tadisina. *Collaboration Technology Support for Knowledge Conversion in Virtual Teams: A Theoretical Perspective*. in *40th Hawaii International Conference on System Sciences (HICSS)*. 2007. Hawaii.
41. Furst, S.A., et al., *Managing the life cycle of virtual teams*. Academy of Management Executive, 2004. **18**(2): p. 6-20.
42. Badrinarayanan, V. and D.B. Arnett, *Effective virtual new product development teams: an integrated framework*. Journal of Business & Industrial Marketing, 2008. **23**(4): p. 242-248.
43. Boutellier, R., et al., *Management of dispersed product development teams: The role of information technologies*. R&D Management, 1998. **28**(13-25).
44. Ojasalo, J., *Management of innovation networks: a case study of different approaches*. European Journal of Innovation Management, 2008. **11**(1): p. 51-86.
45. Kratzer, J., R. Leenders, and J.V. Engelen, *Keeping Virtual R&D Teams Creative*. Industrial Research Institute, Inc., 2005. **March-April**: p. 13-16.
46. Gaudes, A., et al., *A Framework for Constructing Effective Virtual Teams* The Journal of E-working 2007 **1**(2): p. 83-97
47. Hunsaker, P.L. and J.S. Hunsaker, *Virtual teams: a leader's guide*. Team Performance Management, 2008. **14**(1/2): p. 86-101.
48. Pihkala, T., E. Varamaki, and J. Vesalainen, *Virtual organization and the SMEs: a review and model development*. Entrepreneurship & Regional Development, 1999 **11**(4): p. 335 - 349.
49. Piccoli, G., A. Powell, and B. Ives, *Virtual teams: team control structure, work processes, and team effectiveness*. Information Technology & People, 2004. **17**(4): p. 359 - 379.
50. Rosen, B., S. Furst, and R. Blackburn, *Overcoming Barriers to Knowledge Sharing in Virtual Teams*. Organizational Dynamics, 2007. **36**(3): p. 259-273.
51. Zakaria, N., A. Amelinckx, and D. Wilemon, *Working Together Apart? Building a Knowledge-Sharing Culture for Global Virtual Teams*. Creativity and Innovation Management, 2004. **13**(1): p. 15-29.
52. Pauleen, D.J., *An Inductively Derived Model of Leader-Initiated Relationship Building with Virtual Team Members*. Journal of Management Information Systems, 2003. **20**(3): p. 227-256.
53. Ortiz de Guinea, A., J. Webster, and S. Staples. *A Meta-Analysis of the Virtual Teams Literature*. in *Symposium on High Performance Professional Teams Industrial Relations Centre*. 2005. School of Policy Studies, Queen's University, Kingston, Canada.
54. Hossain, L. and R.T. Wigand, *ICT Enabled Virtual Collaboration through Trust*. Journal of Computer-Mediated Communication, 2004. **10**(1).
55. Shachaf, P. and N. Hara, *Team Effectiveness in Virtual Environments: An Ecological Approach*, in *Teaching and Learning with Virtual Teams*, P.a.G. Ferris, S., Editor. 2005, Idea Group Publishing. p. 83-108.
56. Poehler, L. and T. Schumacher, *The Virtual Team Challenge: Is It Time for Training?*, in *PICMET 2007* 2007 Portland, Oregon - USA p. 2205-2211.
57. Vaccaro, A., F. Veloso, and S. Brusoni, *The Impact of Virtual Technologies on Organizational Knowledge Creation: An Empirical Study*, in *Hawaii International Conference on System Sciences*. 2008, Proceedings of the 41st Annual Publication p. 352-352.
58. Paul, S., et al. *Understanding Conflict in Virtual Teams: An Experimental Investigation using Content Analysis*. in *38th Hawaii International Conference on System Sciences*. 2005 Hawaii.
59. Lurey, J.S. and M.S. Raisinghani, *An empirical study of best practices in virtual teams* Information & Management, 2001. **38**(8): p. 523-544.
60. Martinez-Sanchez, A., et al., *Teleworking and new product development*. European Journal of Innovation Management, 2006. **9**(2): p. 202-214.
61. Qureshi, S. and D. Vogel, *Adaptiveness in Virtual Teams: Organisational Challenges and Research Directions*. Group Decision and Negotiation 2001. **10**(1): p. 27-46

62. Ocker, R.J. and J. Fjermestad, *Communication differences in virtual design teams: findings from a multi-method analysis of high and low performing experimental teams*. The DATA BASE for Advances in Information Systems, 2008. **39**(1): p. 51-67.
63. Ryssen, S.V. and S.H. Godar, *Going international without going international: multinational virtual teams*. Journal of International Management, 2000 **6** (1): p. 49-60.
64. Boehe, D.M., *Product development in MNC subsidiaries: Local linkages and global interdependencies*. Journal of International Management, 2007. **13**: p. 488–512.
65. Chen, M., et al., *Team Spirit: Design, implementation, and evaluation of a Web-based group decision support system*. Decision Support Systems, 2007. **43**: p. 1186–1202.
66. Pawar, K.S. and S. Sharifi, *Physical or virtual team collocation: Does it matter?* International Journal of Production Economics 1997. **52**: p. 283-290.
67. Precup, L., et al., *Virtual team environment for collaborative research projects*. International Journal of Innovation and Learning, 2006. **3**(1): p. 77 - 94
68. Fuller, J., et al., *Community based innovation: How to integrate members of virtual communities into new product development*. Electronic Commerce Research, 2006. **6**(1): p. 57-73.
69. Bayraktar, E., et al., *Evolution of operations management: past, present and future*. Management Research News, 2007. **30**(11 Page:): p. 843 - 871.
70. Ruikar, D., et al., *Using the semantic web for project information management*. Facilities, 2007. **25**(13/14): p. 507 - 524.
71. Hinds, P.J. and M. Mortensen, *Understanding Conflict in Geographically Distributed Teams: The Moderating Effects of Shared Identity, Shared Context, and Spontaneous Communication*. Organization Science, 2005. **16**(3): p. 290-307.
72. Kayworth, T.R. and D.E. Leidner, *Leadership Effectiveness in Global Virtual Teams* Management Information Systems, 2002. **18**(3): p. 7 - 40
73. Wong, S.S. and R.M. Burton, *Virtual Teams: What are their Characteristics, and Impact on Team Performance?* Computational & Mathematical Organization Theory, 2000. **6**(4): p. 339-360.
74. Ramayah, T., et al., *Internal Group Dynamics, Team Characteristics and Team Effectiveness: A Preliminary Study of Virtual Teams*. The International Journal of Knowledge, Culture and Change Management, 2003. **3**: p. 415-435.
75. Bell, B.S. and S.W.J. Kozlowski, *A Typology of Virtual Teams: Implications for Effective Leadership*. Group and Organization Management, 2002. **27**(1): p. 14-49.
76. Griffith, T.L., J.E. Sawyer, and M.A. Neale, *Virtualness and Knowledge in Teams: Managing the Love Triangle in Organizations, Individuals, and Information Technology*. MIS Quarterly, 2003. **27**(2): p. 265-287.
77. Shachaf, P., *Bridging cultural diversity through e-mail*. Journal of Global Information Technology Management, 2005. **8**(2): p. 46-60.
78. Jacobsa, J., et al., *Exploring defect causes in products developed by virtual teams* Information and Software Technology, 2005. **47**(6): p. 399-410.
79. Kirkman, B.L., et al., *Five challenges to virtual team success: lessons from Sabre Inc*. Academy of Management Executive, 2002. **16**(3): p. 67-79.
80. Taifi, N., *Organizational Collaborative Model of Small and Medium Enterprises in the Extended Enterprise Era: Lessons to Learn from a Large Automotive Company and its dealers' Network.*, in *Proceedings of the 2nd PROLEARN Doctoral Consortium on Technology Enhanced Learning, in the 2nd European Conference on Technology Enhanced Learning*. 2007, CEUR Workshop Proceedings.: Crete, Greece.
81. Baskerville, R. and J. Nandhakumar, *Activating and Perpetuating Virtual Teams: Now That We're Mobile, Where Do We Go?* IEEE Transactions on Professional Communication, 2007. **50**(1): p. 17 - 34