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# **A Typology of Virtual Organizations: An Empirical Study**

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## **Abstract**

This paper reports on a survey of 55 organizations employing the virtual model. Based on survey responses and additional project and background information supplied by the organizations, this descriptive study develops a typology of virtual organizations including four distinct types: virtual teams, virtual projects, temporary virtual organizations and permanent virtual organizations. These four forms differed on the range of involvement of members, the membership of the group, organizational mission, and length of the project(s) undertaken. The four forms also differ in their use of information technology : fully virtual organizations using the Internet actively for connections, virtual teams and virtual projects relying more on the mature applications such as EDI, e-mail and fax and temporary virtual organizations relying more on groupware and WANs.

## **Introduction**

The emergence of the "virtual organization" as an organizational form has evolved from a futuristic concept to an identifiable structure across a variety of organizations. Definitions of the virtual organization share a common view of different organizations coming together as a newly defined unit. These virtual organizations are often incarnated as a virtual team made up of representatives from different organizations, often from differing physical locations, and reflecting differing organizational cultures.

These descriptions of virtuality, in general, propose an entrepreneurial situation in which organizations or pieces of an organizational team exploit opportunities or take advantage of shared expertise, market access, or sharing of costs and risks. The coordination of the group is critical to achieving the desired results of increased value added to both business processes and organizational mechanisms (Venkatraman, 1995). The virtuality of virtual organizations has been described as having two key features: creation of a common value chain between distinct entities and distributed, information technology (IT) supported business processes (Seiber and Griese, 1997).

Much of the existing literature describing the virtual workplace consists of qualitative descriptions of existing virtual forms. Virtual inter-organizational linkages (Benjamin and Wigand, 1995) have evolved, making the vertical distribution chain obsolete in some industries (Davidow and Malone, 1992). Virtual linkages have also been described between organizations that disband over time. For example, the virtual linkage between Ford and Nissan to support the joint development of a new minivan (Davidow and Malone, 1992) and intra-organizational teams created to tackle business process

reengineering initiatives (Davenport and Short, 1990) were established as temporary linkages.

Information technology is a primary mechanism for providing support and control to virtual forms (DeSanctis and Jackson, 1994). Communication within virtual organizational forms is increasingly supported by information technology (Gray and Igbaria, 1997). An understanding of different virtual forms is important as each of these forms may play a different organizational role and have different IT needs (Palmer, 1997). Therefore, to best support the development and success of virtual entities, we not only need an understanding of the virtual form, but also the differences in the use of information technology in these teams.

### **Methodology**

The methodology used in this research is a cross-sectional survey. Organizations were randomly selected through the listings provided in Goldman, Nagel and Preiss (1995) and Internet listings of virtual organizations. The unit of analysis was the organization.

Respondents were information technology managers at each organization. Respondents were asked to identify the level of use of specific information technologies including: fax, e-mail, LAN, WAN, Intranet, WWW sites. In addition, respondents were asked for their perceptions as to the role and importance of IT within the organization and in its relationship with partners.

### **Findings**

One hundred surveys were sent out and fifty-five were completed. The responding organizations represent a variety of organizational types, locations, and missions. The organization staff size averages 35 and range in size from under 10 (20%) to 250. The average annual budget is about \$6 million, but only about a quarter of the organizations have budgets in excess of \$10 million. The organizations have been established recently, with an average year of founding of 1988 and nearly half established in the 1990s.

#### **Organizational Types**

Respondents identified the scope of the work, the projected length of time spent in virtual work, types of projects, the range of involvement and the number of personnel involved. These criteria suggested four distinct virtual organizational types: permanent virtual organizations, virtual teams, virtual projects, and temporary virtual organizations.

##### ***Permanent Virtual Organizations***

This virtual organization was designed, from its inception, as a virtual organization to bring together market players and respond to opportunities for both improved revenue-generating activities as well as cost savings. This is a model which involves the virtual

concept in all operations, including virtual tasks, teams, and management of the organization's activities.

***Virtual Teams***

Internal organizational use of the virtual concept has generated virtual teams in a variety of organizations. In most cases these teams come from a specific functional, process or strategic business unit within a larger organization. The organizational use of the virtual concept in this instance is in virtual tasks and virtual teams (Greiner and Metes, 1996).

***Virtual Projects***

A third incarnation of the virtual organization is the virtual project. In this design, organizations form alliances or consortia to bring complementary organizations together in meeting market opportunities. Alliances formed call on manufacturers, developers, and markets from a variety of organizations to respond more effectively to market opportunities. In many cases these are organizations based around similar industries or company types. Examples include new business alliances, industry trade associations, or cooperative activity and buying consortia joined together for the purpose of mutual benefit.

***Temporary Virtual Organizations***

An extension of the virtual project design is to establish a temporary virtual organization to take on multiple projects and develop responses to a specific market opportunity. When the market opportunity has ended, so has the organization. This is the initial virtual organizational model (Byrne, 1993, Davidow and Malone, 1993, Goldman, Nagel and Preiss, 1995), involving virtual tasks, teams, operation, and virtual management of the organization's activities.

**Table 1. Comparison of Virtual Organizational Types and Use of IT**

Variable	Team n=22		Project n=12		Temporary n=7		Permanent n=13		Sig
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F
Budget (millions)	6.6	6.5	9.7	8.9	3.1	3.4	2.3	2.7	3.53*
EDI	1.81	1.12	2.10	1.45	1.00	.63	.85	.69	3.74*
Fax	3.82	.45	3.80	.49	3.23	1.11	3.25	1.14	3.00*
E-mail	3.81	.51	3.90	.32	2.67	1.37	3.23	1.01	4.77**
Groupware	2.10	1.34	3.00	1.33	1.67	1.51	1.08	1.19	4.19**
WWW	2.00	1.14	2.33	1.07	1.86	1.35	3.23	.93	3.92*

\* p < .05 \*\* p < .01

## **Use of Information Technology**

Respondents were asked to identify key elements of their information technology infrastructure, including use of mainframe, PCs, LANs, WANs and the Internet. Only 18% of the organizations used mainframes. PCs were ubiquitous with all but one organization having a PC. The use of the Internet was also quite high (93%), perhaps not surprising given the nature of the organizations and their interest in connecting with partners and using the Internet to gather as well as disseminate information. Internal connectivity was also high, with 89% of the organizations having a LAN.

## **Discussion**

Virtual organizations and teams are partnerships and the way in which the connections with partners are made is often crucial to success. The results of this study suggest that there is still significant use of older technologies, including fax, that are used on a daily basis for making these connections. This use is significantly higher than the use of e-mail or the Internet. Perhaps this reflects the importance for virtual teams to use tested technologies, because the connections are so critical. Yet the fully virtual organizations suggest much lower usage of these more mature applications. This is a surprising finding that suggests the need for further study.

The use of IT to support the virtual organization and virtual teams does differ. Fully virtual organizations are using the Internet actively for connections, and relying less on mature applications such as EDI, e-mail and fax. Virtual teams are relying more on the mature applications. These virtual teams have larger budgets, have been around longer, and feel that IT is more critical to organizational success.

The responses suggest that the fully virtual organization does feel IT makes it look larger, since these organizations are typically the smallest in the sample (in terms of budget). Increased partner loyalty seems to be crucial here, too, because the partnerships are so critical to organizational success.

These findings begin to challenge the underlying assumptions of virtual organizations as temporary organizations, gathered around a common opportunity, supporting the Greiner and Metes (1996) contention that organizations can be built to undertake virtual tasks, teams, and operations.

## **Conclusions**

The virtual organization model has been used in several different organizational settings. Increasingly, the virtual model is appearing as a continuing organizational model and not one temporarily designed in response to a market opportunity.

If these findings are replicated in other empirical studies, the question of IT as a key enabler of virtual organizations and the role of mature and emerging technologies and applications may need to be redefined.

If fully virtual organizations exist primarily in an Internet based environment, this suggests a need to fully capture the Internet capabilities in support of the virtual organization. Are fully virtual organizations using the Internet to take the place of the functionality of EDI, e-mail and groupware? If so, we have yet to determine what this suggests for the future of these technologies and the integration of these applications into the Internet.

**Table 2. Virtual Organization Types Comparison on Multiple Dimensions**

	Virtual Teams	Virtual Projects	Temporary Virtual Organizations	Permanent Virtual Organizations
Range of Involvement	Internal to an organizational function or departmental unit	Across functions and organizations	Across organizations	Across organizations
Membership	Small, local	Indeterminate	Typically larger	Typically smaller, but scaleable
Mission	Teams on specific, ongoing tasks	Multiple organizational representatives working on specific projects	Multiple functions responding to a market opportunity	All functions and full functionality as a working organization
Length of project	Membership varies, but form is permanent	Temporary	Temporary	Permanent
Uses of IT	connectivity, sharing embedded knowledge (e-mail, groupware)	Repository of shared data (databases, groupware)	shared infrastructure (groupware, WANs, remote computing)	channel for marketing and distribution, replacing physical infrastructure (Web, Intranet)

**References available on request from either author**