

# A Review of Virtuality and Collaborative Networks

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**Abstract.** Organizations have developed collaborative alliances with the enterprises they interact with in the virtual environment. This paper explores virtualization, collaborative networks and virtual teams. The current status of collaborative practices and recent research activities in virtualization are reviewed to determine what further developments and research is anticipated.

**Keywords:** Virtuality, Collaborative Network, Virtual teams

## 1. Introduction

The original defining of virtual enterprises was in terms of partner organizations collaborating to offer a unique product or service to customers.

Having the facility to readily change (or create) new organizational structures helped in the achievement of a sustained competitive advantage. This facility to change organisational structures had been heralded as revolutionary as it permitted the creation of new business models, which could change conventional relationships. This transcendence across organisational boundaries created non-traditional boundaries with fewer bureaucratic structures [7].

Sandhya (2006) mapped organisational virtuality in terms of having three primary stakeholders' directions namely: the external customer; internal customer; and value chain partner. Brunelle (2009) more simply states that every organisation has a virtual dimension and that all organisations can be situated on a virtuality continuum that extends from being *not very virtual* to *very virtual*.

## 2. Collaborative Network

The collaborative network consists of heterogeneous and autonomous partners [1] and this business model permits the rapid integration of competencies to establish an experience-centric network [2]. This 'establishment' is an effective and reconfigurable value system in which the value creation activities, that can also involves customers, leads to the co-creation of products and services to meet the demands of individual customers or group of customers. Within the collaborative network each member will have its own core values and the success of the collaboration is the alignment of these values amongst the partners [1]. However alignment has normally been viewed in terms of the partner's matching competencies or technological fit [3]. Rosas and Camarinha-Matos (2009) suggest that past partnership failures cannot always be contributed to these 'hard' factors. They further suggest that there are other factors that may have been at play that could have significantly influence the collaboration. These factors termed 'soft', can include past behaviour, ethical stance, norms, values and trust. The concept of alignment of core value can be a difficult concept to define but alignment is a prerequisite for successful collaboration [1]. A proposal from Rosas and Camarinha-Matos (2009) is the creation of a collaboration readiness assessment model. This model is based on the organisation's character concept which identifies behaviour patterns of the organisation which can be associated with identifiable traits which determine the preponderance for certain behaviour. A drawback in any assessment is the necessary delay to perform an assessment. However this assessment may not be critical

within a small collaborative network where partners share the same language and business background [4] and presumably core values. The converse, where there are multicultural partners who are geographical dispersed presents a more difficult assessment task. An approach to minimising the time for this assessment task is the establishment of the virtual organisation breeding environment (VBO). The VBO is an association of organisations who have a long-term cooperation agreement to collaborate in the future [4]. The aims of this agreement is to establish trust, reduce the time in the configuration or reconfiguration of an enterprise and providing commonality in infrastructure and cooperative business rules and metrics to measure partner's performance [4]. A key element of such an agreement is the trustworthiness of other partners which must be thoroughly analysed in order for the collaboration to be effective [5]. Msanjila and Afsarmanesh (2009) have proposed a system that adopts multi-criteria mechanisms based on mathematical equations to create a rational assessment of the trust level of potential partners. In this system the trust aspects under consideration are classified into five perspectives, technological, social, structural, managerial, and economical and are further described in Msanjila and Afsarmanesh [6].

The assessment of trust amongst partners with the virtual environment is normally performed manually in an ad-hoc manner. However this has become more challenging as emerging breakthrough solutions are becoming more innovative and complex [5]. To address this challenge Msanjila and Afsarmanesh (2009) have developed a Trust Management System which adopts multi-criteria mechanisms to support the rational assessment of the trust level of a potential partner organisation. Effective collaborate amongst virtual enterprise partners will only be achieved when there is a degree of assurance about the trustworthiness of others [7].

### 3. Virtual Teams

Virtual teams are composed of people whose interactions are mainly by electronic media and in to-day's world that media is primarily the internet. The composition of a team is group of people with complementary skills with a common goal. Many large organisations have virtual teams to some extent in fields such as R&D and customer services [8]. However the impetus for virtual teams can be the result of alliances with partner organisations within the virtual environment. The virtual team within the virtual enterprise can work across different time zones and dispersed geographical locations allowing the co-ordination of highly interdependent tasks [9]. This permits the virtual organisation to have unprecedented levels of flexibility and responsiveness [10] compared to the traditional organisation. The use of a virtual team is frequently in the development of new products or services. Small to medium enterprises in particular can benefit by being part of a pool of knowledge exploring innovative products or services. Virtual teams have been found to be very effective as they adopt formal procedures, have structured processes and have a greater task-oriented approach [10]. Any potential for conflict tends to be lower the longer the collaboration continues [8]. The members of a virtual team are viewed as empowered professionals who have the initiative to leverage and integrate diverse competencies to create an innovative product or service [9]. However the management of virtual teams is an area with little grounding in the literature [8] and to ensure that virtual teams accomplish their common goal requires good leadership, the same as in a traditional organisation. However a team leader of a virtual team does not have the opportunity to observe members and therefore must adopt appropriate practices. Malhotra et al (2007) highlight six practices used by virtual team leaders, as shown in Table 1.

Table 1. Virtual Team Leaders Practices

1. Establish and maintain trust through the use of communications technology
2. Ensure diversity in the team is understood, appreciated and leveraged
3. Manage virtual work-cycle and meetings
4. Monitor team progress through the use of technology
5. Enhance external visibility of the team and its members
6. Ensure individuals benefit from participating in virtual teams.

These leadership practices were found to be conceptually accepted and practically applied in a study of one exemplary virtual team leader [11].

Information technology (IT) provides the communication link for virtual team members. However concern has been raised that as the members are structurally diverse not only should content be communicated but also the context. This is deemed necessary to overcome the diversity of perspectives of the members which creates the opportunity for misunderstandings [12]. Majchrzak et al (2005) identified eleven IT functionalities associated with support for contextualization, as shown in Table 2.

Table 2. IT Functionalities Associated with Contextualization Support

1. Easily know who contributed a piece of knowledge to the team repository
2. Easily find specific entries in repositories that have been made by specific individuals
3. Easily link my team's repository with other knowledge sources and applications
4. Easily identify historical connections between entries
5. Easily allow different people to find summaries as well as details in the repository
6. Easily interweave notes, chat, e-mail, and documents in the repository
7. Easily know rationale behind the decisions made by team members so that decisions and rationale can be revisited later
8. Easily label an entry with multiple key words it pertains to
9. Easily view annotations and comments on knowledge in team repository made by other team members
10. Be informed when knowledge in repository changes
11. Easily change identifiers on knowledge in repository as team's ideas evolve over time

It was deemed that this contextualisation was more necessary when team members were performing non-routine work.

#### **4. Discussion**

Virtuality is still having a considerable impact on business processes and organisational structures. Developments are in hand to refine the approaches to collaborative activities of networked partners within virtual enterprises.

An on-going and common concern since the inception of virtuality has been the topic of trust. Exploration is necessary to validate new systems that will support the management of trust which will ease the formation of virtual enterprises.

Virtual team members have commitments to their employing organisation and to the virtual enterprise which could raise possible conflicts. Thus there is a need for more systematic research that will explore the different degrees of virtuality and the possible effects on team processes. In parallel to this longitudinal studies would acknowledge the developmental aspects of virtual teams such as the reduced potential for conflict. Attention also needs to be given to the methods for the contextualisation of communications amongst virtual team members.

There is also a need to be able to predict which partners would facilitate successful collaboration. Partner assessment is important to determine the degree of suitability of potential partners which may be based on their past work in collaborative networks. A common focus in this assessment has been on 'hard' factors such as the matching of competencies but there is also a need to consider 'soft factors' such as the organisation's character and research is needed to develop a full assessment model for collaboration readiness. The alignment of values can enable partner organisations to identify potential partners but no measures are available. Thus there is a need for the development of methodologies to measure the value system alignment in collaborative networks as a predictive indicator of collaboration.

Internet technology enables a variety of organisational structures to be created and as allured to throughout the paper the facility of virtuality has and will continue to enable a variety of organisational structures to be created and other structures still yet to be conceptualised.

## 5. References

- [1] Abreu, A., Macedo, P., and Camarinha-Matos, L. M., 2009, "Elements of a Methodology to Assess the Alignment of Core-Values in Collaborative Networks," *International Journal of Production Research*, 47(17), pp. 4907-4934.
- [2] Romero, D., and Molina, A., 2011, "Collaborative Networked Organisations and Customer Communities: Value Co-Creation and Co-Innovation in the Networking Era," *Production Planning & Control*, 22(5/6), pp. 447-472.
- [3] Rosas, J., and Camarinha-Matos, L. M., 2009, "An Approach to Assess Collaboration Readiness," *International Journal of Production Research*, 47(17), pp. 4711-4735.
- [4] Oliveira, A. I., Camarinha-Matos, L. M., and Pouly, M., 2010, "Agreement Negotiation Support in Virtual Organisation Creation-an Illustrative Case," *Production Planning & Control*, 21(2), pp. 160-180.
- [5] Msanjila, S. S., and Afsarmanesh, H., 2009, "On Development of Trustman System Assisting Configuration of Temporary Consortiums," *International Journal of Production Research*, 47(17), pp. 4757-4790.
- [6] Msanjila, S. S., and Afsarmanesh, H., 2007, "Hici: An Approach for Identifying Trust Elements the Case of Technological Trust Perspective in Vbes," eds., pp. 757-764.
- [7] Brown, K., Royer, S., Waterhouse, J., and Ridge, S., 2005, "Virtual Workforces and the Shifting Frontier of Control," *Journal of Industrial Relations*, 47(3), pp. 310-325.
- [8] Hertel, G., Geister, S., and Konradt, U., 2005, "Managing Virtual Teams: A Review of Current Empirical Research," *Human Resource Management Review*, 15(1), pp. 69-95.
- [9] Malhotra, A., Majchrzak, A., and Rosen, B., 2007, "Leading Virtual Teams," *Academy of Management Perspectives*, 21(1), pp. 60-70.
- [10] Ebrahim, N. A., Ahmed, S., and Taha, Z., 2009, "Virtual Teams: A Literature Review," *Australian Journal of Basic & Applied Sciences*, 3(3), pp. 2653-2669.
- [11] Hirschy, M. J., 2011, "Virtual Team Leadership: A Case Study in Christian Higher Education," *Christian Higher Education*, 10(2), pp. 97-111.
- [12] Majchrzak, A., Malhotra, A., and John, R., 2005, "Perceived Individual Collaboration Know-How Development through Information Technology-Enabled Contextualization: Evidence from Distributed Teams," *Information Systems Research*, 16(1), pp. 9-27.