

# A Research Note on Virtual Project Management Systems

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## Abstract

The objective of this paper is to report intermediate research results on the comparison and benchmarking of two tools that are developed as virtual project management systems (VPMS). Based on the theoretical framework for VPMS of Zigurs, Evaristo, and Katzy [2001] we conclude that these systems can be regarded as antecedents of a 'new generation' of project management systems. Both systems, however, follow different basic virtual management principles; while the first assumes strong central management for all projects, the second assumes distributed self-management of each project. Consequently, both systems have distinct designs. Further research is needed to establish typologies of VPMS.

## Keywords

Virtual Organizations, Project Management, Enterprise Systems

## 1 Introduction

Projects are the most common organizational form of concurrent engineering efforts in specific, and knowledge intensive working in general [Cramton 2000]. For our purposes it is sufficient to define a project as a temporary management structure that is established to meet specified goals under time and resource constraints [Shenhar 1998]. There is a dearth in research of distributed project management. Traditional project management on the one side mainly deals with task coordination (eg. PERT, Gantt), without however, addressing specific issues that derive from distribution [Evaristo, Fenema 1997]. Virtual teams and virtual organizations [Mowshowitz 1999] on the other side usually deal with how distributed teams and networked organizations can exist but are less concerned with how the tasks of a project are accomplished. More closely related to VPMS are Group Decision Support System (GDSS), which deal with how distributed teams can be enabled through IT in their decision-making. From a project management perspective, however, decisions are but one relevant dimension of managing virtual projects. While all these research streams further the understanding of important aspects, none covers the full specifics of virtual project management.

The objective of this paper is to contribute to understanding the issues of virtual project management and to explore functionalities of emerging VPMS. This is intended to extend the theoretical knowledge on distributed project management and to validate the research framework for VPMS. The paper will be structured as follows. In a first chapter we will revisit existing literature and operationalize the framework of Zigurs, Evaristo and Katzy for our benchmark test. In the second chapter we will shortly present the two tools, and compare them in chapter three. In chapter four we will draw our conclusions for future research and the managerial practice.

## 2 Theoretical Background

The theoretical framework [Zigurs, Evaristo, Katzy 2001] of this paper refers to virtual project management systems (VPMS) as integrated systems of technology, people and process that cover the dimensions of coordination, knowledge and process of managing distributed projects. The key contribution of this framework is a redefinition of what ‘project management’ entails: from the traditional task-coordination perspective to the redefined (virtual) project perspectives of a continuous process of creating and dissolving projects. We will specially build on the argument of Zigurs, Evaristo and Katzy that VPMS can be characterized by the underlying philosophy of project management, which characterizes the architecture of the VPMS. Three benchmarking dimensions are proposed for comparison:

**Coordination Dimension:** coordination is the mechanisms through which individuals integrate their productive activities. The focus of traditional project management is task coordination with Gantt and PERT charts; in the virtual perspective coordination of the switching process of partners into a new project is of equal importance. This includes for example partner search, partner selection, contracting, and wind-up procedures of projects.

**Knowledge Dimension:** knowledge is often defined as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information [Katzy, Evaristo, Zigurs 2000]. In traditional project management capacities, tasks - not knowledge - are managed; in the virtual project perspective access to knowledge in many cases is the essence of creating new projects.

**Process Dimension:** Process management reflects the team building process within the project lifecycle, and builds on the group dynamics phases of forming, storming, norming, performing and dissolving. In traditional project management, only the performing phase of the process is dealt with, while in the virtual project perspective the full life cycle gains importance.

## 3 Research Approach

We benchmarked two selected VPMS by criteria adapted from the above-mentioned research framework. Benchmarking is a practical research methodology, which consists of four fundamental elements. First, to define criteria and tasks to perform by the candidate tools in the test; second the selection of the tools to be invited for the benchmark; third task execution by the tools; and fourth comparison of the tool and drawing of conclusion.

The first tool is VICOPLAN [Hess 2002], which is a prototype of a planning and control system for virtual corporations in the service industry and is used by one virtual organization consisting of more than 20 partners. VICOPLAN is designed mainly for use in service industry and consists of three modules: Order management, analysis and master data management. VICOPLAN distinguishes two types of management tasks, order-related tasks and ‘above-order’ tasks.

The second tool is WebCorp [webcorp 2002], which is based on the “virtual factory (VF)” concept and developed to manage distributed projects, which they call virtual factories, within a stable network of the virtual organization partners. At present 37 companies cooperate in the network, employing a total of 3,000 employees. WebCorp shows a two-tier structure: the first is an Intranet platform to facilitate communication within the virtual factory; the other is a public Webpage. The Intranet toolset is the medium used by a network broker to contact potential partners. It includes 3 modules: A contact database for mailing lists, documents, drawings etc., order management, and third project management.

## 4 Intermediate Benchmarking Data

Table 1 summarizes the comparison data for the dimensions of the benchmarking framework.

	VICOPLAN	WEBCORP
Project  Process	Forming: Central Placement of tender bidding, central selection, yes/no decision	Negotiation/Competence Database
	Norming: Pre-defined Contract	In teams, face-to-face meeting, rules
	Storming: Little, order oriented	Rules of the game, training, meetings
	Performing: Time/cost control	Documenting/knowledge sharing, task coordination
	Dissolving: Delivery	Face-to-face meeting, debriefing
Coordination	The project manager divides task into subtasks, each subtask is contracted by one supplier and delivered.	Task definition and task breakdown is done in the physical kick-off meeting, partners decide in consensus to whom subtasks are allocated
	Seldom physical meeting in project course	Work meeting in the fixed interval in project course
	Full cost/time transparency for project manager over all partners	Shared agenda and To Do list Calculation standards exist, but internal cost/time figures are not shown to project manager.
	Coordination based on detailed resources data (hows, how rate)	Coordination based on results (intermediate results and cumulated cost/time)
	Low IT support, order-related support	High IT support, Intranet, functions like groupware
	Less trust, responsibility needed for partner	More trust, responsibility for partner to delivery
	More direct influence from project manager	Less direct management possibilities for project manager
	Order Manager is responsible for relationship coordination	Network coach will be responsible for it
	Role Coordination: dynamics, shift with project stages, little gatekeeper functionality	Dynamics, shift with project lifecycle and core competence, gatekeeper to avoid totally overlapping competence
	Little support for training	Cultivate the Virtual Cooperation concept and culture through training, meeting, and partner "Spokesman"
	Project manager know the partners through information provided by analysis module	No systematic guarantee of trust, from frequent information exchange
Temporal coordination: defined in the contract, controlled by order manager	Defined through negotiation. Tool provide project schedule to support, Auditor monitor	
Knowledge Management	Standard tasks	Document (explicit) Management
	Little knowledge management	Chat/discussion group
	Flat list of competences	Three level tree-structure competence database

Table 1: Comparison of Tools

## 5 Initial Findings

The intermediate benchmarking data suggest four directions for a generalization of the findings as they are presented in the table above:

1. The two systems follow very different underlying philosophies:  
VICOPLAN's underlying philosophy is one of central coordination.  
WebCorp's underlying philosophy is one of decentralized coordination of the project partners. The system uses web technology only to enable project teams.
2. Two different switching modes [Mowshowitz 1999], on how resources are allocated to business opportunities:  
VICOPLAN supports a central project manager to contract project partners  
WebCorp establishes contact between potential partners from a trusted network who then commit project contributions in mutual negotiation.
3. The role and power of project management:  
The project manager has the overall decision right in VICOPLAN  
The project coach does not directly take part in the specific project, partners have their own self-coordination functionality in WebCorp
4. How and by whom the VPMS is used the virtual organization.
  - VICOPLAN is a planning tool for the use of one project manager / order manager
  - WebCorp is provided for use by each project partner.

## 6 Intermediate Conclusion and research direction:

In this paper, we compare and benchmark the two different virtual project management tools (VPMS) based on the adapted criteria derived from the research framework. It did successfully allow distinguishing two different philosophies and resulting designs of the compared systems. From the comparison, we draw some underlying theoretical management conclusions. We will continue to compare systems and will observe their performance in real world settings to find the "Pressure points" for virtual projects. In doing so we intend to understand the specifics of virtual project management and contribute to solving their high failure rate.

## 7 Reference

- Zigurs, I., Evaristo, R., Katzy, B. R., Collaborative Technologies for Virtual Project Management, Academy of Management Conference 2001, Washington, August 5-9, 2001
- Shenhar, A.J., From theory to practice: Toward a typology of project-management styles, IEEE Transactions on Engineering Management, 45(1), 1998: 33-48
- Evaristo, R., Fenema, P. A typology of project management: emergence and evolution of new forms, International Journal of Project Management.
- Mowshowitz, A., Virtual Organization, Communications of the ACM, 40(9), 1999: 30-37
- Katzy, B.R., Evaristo, R., Zigurs, I. Knowledge Management in Virtual Projects: A Research Agenda, Proceedings of 33<sup>rd</sup> Hawaii International Conference on System Sciences, Maui, 2000
- Teece, D., Pisano, J., Shuen, A, Dynamics capabilities and strategic management Strategic Management Journal, 18(7), 1997:509-533
- Crowston, K., A coordination theory approach to organizational process design, Organization Science, 8(2) 1998: 157-175
- Cramton, C., The mutual knowledge problem and its consequences for dispersed collaboration, working paper, George Mason University 2000
- Hess, T., Planning and Control of Virtual Corporation in the Service Industry: The Prototype VICOPLAN, Proceedings of the 35th Hawaii International Conference on System Sciences, Hawaii, January 7-10, 2002
- [www.webcorp.ch](http://www.webcorp.ch)