Collaborative Performance Measurement

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INTRODUCTION

Due to the increasing heterogeneity and dynamics of the economy, more and more enterprises are challenged to adapt continuously to rapid changes, to concentrate on their core competencies as well as to search for competitive advantages and innovations (e.g., Prahalad & Hamel, 1990). Rapid technological advances and altered customer demands create a new dynamic and complex business environment, which requires flexibility and mobility of enterprises (Camarinha-Matos, 2002). For these reasons, different enterprises have to cooperate in order to meet customer needs effectively, to encounter the contemporary prevalent high competition and innovation pressure as well as to be permanently successful in largely saturated markets. In this respect, the opening of an organization's borders is no longer regarded as a necessary evil but rather as an opportunity of strategic importance. Current approaches mainly focus on the cross-enterprise integration of data, functions, and processes for operational purposes within such collaborative business structures (e.g., Adam, Chikova, Hofer, & Vanderhaeghen, 2005; Grefen, Aberer, Hoffner, & Ludwig, 2001; Schulz, 2002). The driving force behind such activities is to generate a win-win-situation for all partners, whether by creating new structures or by adapting the existing ones, realizing an optimization objective. However, how do you measure if this postulated win-win situation by concentration on core competences is really achieved? The question is: Has the cooperation yielded the objectives that had been determined in the run-up? Is the cooperation really as successful as it was intended to be or can it be improved?

Technological concepts like service-oriented architecture allow enterprises to interconnect their information systems for a collaborative business process execution (e.g., Kupsch & Werth, 2004) but do not support the management controlling of the collaborative processes and the collaboration itself. Because the competition has changed from the competition between single enterprises to an increasing competition between networks, it is necessary to enhance established concepts like business performance management (e.g., Davila, Cucuzza, & Drucker, 1998; Scheer, Jost, Hess, & Kronz, 2005) and business activity monitoring that are focused on intra-enterprise processes. These developments raise the necessity to extend the classic understanding of business performance management to networked businesses. This approach is reflected by the term collaborative performance measurement. It means the collection of controlling data in terms of key performance indicators (KPIs) across organization's borders in order to measure the efficiency of cross-organizational business processes and to prearrange and support decisions for the life cycle of a cooperation.

This article addresses the following objectives: After the introduction, we will show approaches and technologies in business process oriented controlling concepts. In order to enable the enhancements to the state of the art, critical issues of current performance measurement approaches, including scientific as well as technical aspects, are described. Based on this, the article presents a conceptual controlling framework that enables the seamless collaboration controlling between enterprises. Afterwards, the article shows how networked businesses can benefit from a collaborative performance measurement. Finally, we draw a conclusion and give an outlook on future research.

APPROACHES AND TECHNOLOGIES

Business Process Execution

The concept of performance measurement of networked businesses is based on concepts and research results of the three scientific domains of business administration, information systems, and computer systems in order to build an optimized controlling solution (e.g., Kirchmer, Brown, & Heinzel, 2002). Component based architectures that are process-driven and rely on fully developed standards and interfaces can be seen as a state of the art approach to fulfill the required integration of different applications for a necessary collaborative controlling solution (Hess & Wittenberg, 2005).

Therefore, process models are important and used for defining the complex interaction between business objects, including the business logic and execution order of the interactions (Scheer, 2001). This composition of business objects in a process flow is necessary to avoid the loss of the overall context between the single process steps and is defined as process orchestration. Collaboration partners have to be able to access data and applications in an easy and secure way. With the use of XML, the technological interoperability has been established. But semantic business process definitions are still not still interoperable. Efforts like the Business Process Modeling Language (BPML) of the Business Process Management Initiative (BPMI) promise standardization for the management of inter-organizational business processes (Smith & Fingar, 2003). On the one hand, BPML acts as an intermediary between business process modeling tools and IT. On the other hand, BPML enables the interoperability between modeling tools. Furthermore, the wide acceptance of the Business Process Execution Language for Web Services (BPEL4WS) as well as the newly finalized specification of the Web Services Choreography Interface (WSCI) shows the importance of such standardization efforts for interoperability. While BPML is seen as more conceptually oriented, the latter two focus on the transformation into the system level by orchestrating Web services (Zang, Hofer, & Adam, 2004). An appropriate information system providing the coordination is required for the computer supported activity coordination in enterprise networks. Mainly, the global knowledge is stored in a repository, which is logically centralized but can be physically distributed across the enterprise network and is therefore similar to the idea of a Universal Description, Discovery, and Integration (UDDI) repository.

Business Performance Management

The emergence of cross-organizational (also called collaborative) business process execution establishes the need for an IT-supported collaborative controlling, to allow enterprises to manage their collaborations. Nowadays, automatic business process management systems provide enterprise infrastructures for managing and automating processes that have both human and system related tasks. As a matter of fact, cross-organization business process management can be seen as the convergence of workflow, enterprise application integration (EAI), and unstructured or ad-hoc processes (Smith & Fingar, 2004). Recently, there has been a considerable interest in the application of artificial intelligence (AI) techniques to workflow management systems (Melchert, Winter, & Klesse, 2004). A collaborative controlling, which is necessary in this field of business activity, should be based on the achievements that were made in the field of intra-enterprise concepts for business process oriented performance management, which can be summarized under the terms of business performance management and Business Activity Monitoring (BAM) (van der Alst, ter Hofstede, & Weske, 2003). The main idea of process performance management is to control the execution of business processes by comparing process models (for example, to-be models of business processes) with data collected during process execution (for example, as-is models of business processes). The purpose is to identify potentials for improving process execution and to recommend appropriate modifications to the processes (Smith & Fingar, 2003). To enable a better tool support, analysis processes have to be documented in a standardized manner, for example, by using the eXtensible Business Reporting Language (XBRL) to formulate financial reports or the Predictive Modeling Markup Language (PMML) to document data mining models. Business performance management is closely related to BAM, which focuses on the monitoring, filtering, and presentation of events that occur while the IT-supported business processes are executed. By using the results from business process management, BAM supplies decision makers with the necessary information regarding a specific context and the occurrence of a predefined event. Further, BAM makes heavy use of